# ATTACHMENT A
# WLAN Survey: Part I Questions 1-4
# June 2004

| | Little Priest Tribal College | Bryant | Bethune-Cookman College | Georgetown | Northwestern |
|---|---|---|---|---|---|
| **1. Campus Description** | | | | | |
| Fac &Staff | 75 | 400 | 507 | 4,835 | 7,100 |
| Students | 140 | 2,743 | 2,750 | 13,614 | 17,000 |
| Total | 215 | 3,143 | 3,257 | 18,449 | 24,100 |
| Housing | 0 | 2,600 | 1,616 | 5,071 | 5,800 |
| Dispersed or Contiguous | Contiguous | Contiguous | Contiguous | Dispersed | Contiguous |
| Other | | | Buildings all connected by fiber except for one by Tsunami radio bridge | Old buildings | Two campuses, both self-contiguous |
| | | | | | |
| **2.Decision Process Description** | Money was available; only needed 7 AP for entire campus | Fit overall plan to incorporate new technologies to gain competitive advantage and improve the campus learning experience. | To benefit faculty, staff and students. | New construction and as requested (with funding) | To benefit faculty, staff and students. |

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|---|---|---|---|---|---|
| **3. WLAN Description** | | | | | |
| 802.11a, b, g or other | 50/50 | 802.11g | Began with 802.11b, adding some 802.11g | 802.11b | 802.11b and 802.11g |
| *Coverage:(%)* | | | | | |
| Dorm rooms | n/a | 100 | 0 | 10 | 5 |
| Dorm commons | n/a | 100 | 100 | 25 | 15 |
| Classrooms | 100 | 100 | 25 | 10 | 15 |
| Public areas | 100 | 100 | 25 | 20 | 10 |
| Library common areas | 100 | 100 | 100 | 100 | 80 |
| Library stacks | 100 | 100 | 100 | 100 | 80 |
| Eating areas | 100 | 100 | 50 | 100 | 90 |
| Total campus | 100 | 95 | 40 | 20 | 15 |
| *Access points:* | | | | | |
| Total access points | 7 | 248 | 34 | 300 | 275 |
| Additional planned | 0 | 50 | 10 | 100 | 45 |
| Housing (present) | n/a | 120 | 12 | 90 | 35 |
| Housing (planned) | n/a | 10 | 3 | 0 | 5 |
| *Users:* | | | | | |
| Wired users on campus | 100 | 4,000 | 2,000 | 16,000 | 14,000 |
| WLAN users on campus | Only a few | 2,000 | 75 | 2,000 | 5,200 |
| *Tools:* | | | | | |
| Equipment used: | Cisco, Belkin, D-Link | Cisco 1200's AP, Cisco WLSE, Cisco core infrastructure | Avaya/Orinco APs (802.11b and 802.11b/g) | Cisco 350 and 1200 Series APs | Cisco 350 and 1200 Series APs |
| Management Tools: | The diagnostic tools that come with the access points | Cisco WLSE | A radius server and acces point software | Cisco WLSE | Fedelia's Netvigil for monitoring all campus network equipment |

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|---|---|---|---|---|---|
| **4. WLAN Usage Description** | | | | | |
| Total wireless traffic | low | n/a | n/a | 300 users | |
| Average users/average traffic (bytes/sec) | n/a | n/a | 15/11Mbps | 300 users | 1100/.75Mbps |
| Peak users/ peak traffic (bytes/sec) | n/a | n/a | 50/11Mbps | 460 users | 1300/3.75Mbps |
| User preference: wired or wireless | Wired; very few students own wireless devices | Wireless due to convenience. Forecast: wireless | Wireless due to convenience. Forecast: wireless | Wired due to bandwidth. Forecast: wired | Wireless due to convenience. But wired may be required for large downloads. |
| Change in overall Internet usage due to wireless | Negligible | No change | Negligible | Minor Increase | Negligible |
| Applications available over wireless | All applications also on wired LAN | E-mail, web surfing, web portal use; Forecast: same as wired | E-mail, web surfing, online registration and some webct offerings. | All IP applications | All IP applications (no multicast applications) |
| *Data rates/user:* | | | | | |
| On average | n/a | n/a | 3-5Mbps | n/a | 11Mbps |
| Peak usage | n/a | n/a | 1-2Mbps | n/a | 5.5Mbps |
| % asymetric traffic | n/a | n/a | 80% | n/a | 95% |
| System design for peak usage | Not an issue | As budget allows | Additional APs | Overall design for high quality | Additonal APs |

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| | University of Chicago | Virginia Tech | Colorado State | University of Maryland | NYU |
|---|---|---|---|---|---|
| **1. Campus Description** | | | | | |
| Fac &Staff | 14,620 | 5,000 | 7,000 | 12,112 | 11,000 |
| Students | 13,400 | 25,000 | 24,500 | 35,329 | 50,000 |
| Total | 28,020 | 30,000 | 31,500 | 47,441 | 61,000 |
| Housing | 2,300 | 8,500 | 5,900 | 11,579 | 10000+ |
| Dispersed or Contiguous | Contiguous | Contiguous | Contiguous | Contiguous | Contiguous |
| Other | Large teaching hospital with separate data network | 26,000 acre area: wide range of spectrum applications, including ITFS, microwave, satellite teleport, TV/Radio stations, public safety, medical, paging, cellular/PCS, and small airport. | Some lab areas are supported with laptops and access points on carts. | Outdoor areas have many trees that impact signal quality. | Strong fiber infrastructure; 25 distinct address spaces hamper mobility; urban site demands careful position of access points on exterior walls |
| | | | | | |
| **2.Decision Process Description** | Demand driven; needed secure system to avoid rogue access point use; phase 1 (complete): heavy usage areas; phase 2 (in progress): large research labs; phase 3 (future) office areas, new construction (wired and wireless) | Began in conference rooms and common areas; next to academic and administrative buildings; not in dorm rooms due to ethernet | Planned centrally with priority heavy usage areas and by special request | To benefit users by offering an alternative connection; began with heavy usage areas | Interested prior to 802.11; security was and remains greatest concern; grew slowly until a scalable model was achieved; started with common areas; spread as requested by faculty; |

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|---|---|---|---|---|---|
| **3. WLAN Description** | | | | | |
| 802.11a, b, g or other | 802.11b | Upgrading from 802.11b to 802.11g this summer | Primarily 802.11b; new installations are 802.11b/g | 802.11b (except for a few "g" tests) | 802.11b converting to 802.11g within a year. |
| *Coverage:(%)* | | | | | |
| Dorm rooms | 0 | 0 | 20 | 2 | 0 |
| Dorm commons | 95 | 0 | 100 | 2 | 5 |
| Classrooms | 75 | 90 | 75 | 15 | 15 |
| Public areas | 75 | 95 | 50 | 80 | 5 |
| Library common areas | 80 | 100 | 100 | 80 | 40 |
| Library stacks | Marginal | 100 | 100 | 20 | Marginal coverage |
| Eating areas | 95 | 80 | 100 | 100 | 0 |
| Total campus | 40 | 50 | 25 | | 5 |
| *Access points:* | | | | | |
| Total access points | 300 | 300 | 220 | 404 | 360 |
| Additional planned | 200 | 600 | 0 | 0 | 100 |
| Housing (present) | 60 | 0 | 18 | 15 | 0 |
| Housing (planned) | 40 | 0 | 28 | 0 | 12+ |
| *Users:* | | | | | |
| Wired users on campus | 20,000 | 25,000 | 30,000 | 25,000 | 24,000 |
| WLAN users on campus | 2,000 | 2,000 | 1,450 | 800 | 3,000 |
| *Tools:* | | | | | |
| Equipment used: | Cisco 350, 1100 and 1200 APs | Cisco 1200 Aps | Cisco 340 (7), 350 (74) and 1200 (175) Aps | Cisco 350 and 1200 | Cisco (end-to-end) transitioning to 1200 Aps |
| Management Tools: | Fluke wave runner, Berkeley Varitronics Yellow Jacket, Georgia Tech. Lawn System | Cisco WLSE, in-house scripts, MRTG, AirMagnet handheld | Tivoli Net View, Nagios, and a collection of locally developed management tools. | Micromuse Netcool, Wavelink Mobile Manager, Airmagnet, Sniffer Wireless | 2 Cisco WLSEs (on order) |

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|---|---|---|---|---|---|
| **4. WLAN Usage Description** | | | | | |
| Total wireless traffic | | | | | |
| Average users/average traffic (bytes/sec) | 1000/10Mbps | n/a | 50/3.5 Mbps | 5.5Mbps | n/a |
| Peak users/ peak traffic (bytes/sec) | 1500/15Mbps | n/a | 100/7 Mbps | 12Mbps | n/a |
| User preference: wired or wireless | Wireless due to convenience. Forecast: wireless | Laptop and PDA users prefer wireless: desktops prefer wired. Forecast: more wireless | Wired. Forecast: wireless | No preference except in conference rooms | Wireless due to convenience. Forecast: power is more the problem |
| Change in overall Internet usage due to wireless | Minor Increase | Negligible | <10% | | Negligible |
| Applications available over wireless | Web and e-mail; no restrictions on applications Forecast: same | Currently, best effort Internet/Intranet. Forecast: voice and multimedia. | E-mail and web. Forecast: Wireless integration with Univ. portal | All current network resources; Forecast: voice | All IP applications; NYUnet; (P2P is blocked) |
| *Data rates/user:* | | | | | |
| On average | .1Mbps | 1.5 Mbps | 2-3 Mbps | n/a | n/a |
| Peak usage | .2Mbps | .5 Mbps | <1Mbps | n/a | n/a |
| % asymetric traffic | 66% | 80% | 90% | 90% | n/a |
| System design for peak usage | Wired available as alternative | Upgrading from 802.11 b to g | Designed for coverage not usage; no problems so far | Designed for coverage not usage except in large lecture halls | More access points running on a very low power; no problems so far. |